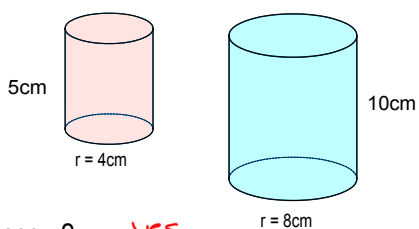


Areas and Volumes of Similar Solids

Similar solids--same shape, but not necessarily the same size

All spheres are similar.

For other solids:
Bases must be similar and other corresponding lengths must be proportional.



ex 1:

Are the bases ~?

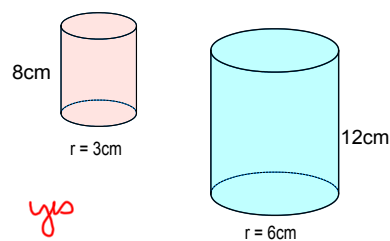
yes

Scale factor?

$$\frac{4}{8} = \frac{1}{2}$$

Are other lengths proportional?

$$\frac{5}{10} = \frac{1}{2} \text{ yes}$$



ex 2:

Are the bases ~?

yes

Scale factor?

$$\frac{3}{6} = \frac{1}{2}$$

Are other lengths proportional?

$$\frac{8}{12} \neq \frac{1}{2} \text{ No}$$

Not ~

ex 3: $r = 4\text{cm}$
 $h = 6\text{cm}$

Are bases ~? \checkmark
 Heights ~? \checkmark
 Scale Factor? $2:3$

Find the following for each figure and compare the ratios to scale factor.

	small	large
l	$2\sqrt{13}$	$3\sqrt{13}$
C	8π	12π
B	16π	36π
LA	$\frac{1}{2} 8\pi \cdot 2\sqrt{13} = 8\pi\sqrt{13}$	$\frac{1}{2} 12\pi \cdot 3\sqrt{13} = 18\pi\sqrt{13}$
TA		
V	$\frac{1}{3} 16\pi \cdot 6 = 32\pi$	$\frac{1}{3} 36\pi \cdot 9 = 108\pi$

$8:12$
 $16:36$
 $32:108$

$2:3$
 $2:3$
 $4:9$
 $8:27$

$$\frac{8\pi\sqrt{13}}{18\pi\sqrt{13}}$$

Theorem 13.1--If the scale factor of 2 ~ solids is a:b, then:

1. The ratio of corresponding perimeters is a:b
2. The ratio of corresponding areas is $a^2:b^2$
3. The ratio of corresponding volumes is $a^3:b^3$

Ex:

The scale factor of 2 cones is 5:6.
 What is the ratio of:

P 5:6
 LA 25:36
 TA 25:36
 V 125:216
 l 5:6
 r 5:6

If the LA of smaller is 100
 what is LA for the larger?

$$\frac{25}{36} = \frac{100\pi}{x}$$

$$\pi \quad 144\pi$$

If the V of smaller is 86.4
 what is V for the larger?

$$\frac{125}{216} = \frac{86.4\pi}{y}$$

$$\pi \quad 149.3\pi$$

Ex:

Two solid metal cylinders are similar.
 radius of 1st = 10cm
 radius of 2nd = 14cm

What is the scale factor?

5:7

If the smaller cylinder weighs 2.5 kg,
 how much does the larger one weigh?

$$\frac{125}{343} = \frac{2.5}{x} \quad \text{Volume} \quad \text{6.9 kg}$$

Ex:

Two similar pyramids have LA = 12cm² and LA = 27cm².

What is the scale factor?

12:27
 *4:9 Ratio of Areas
 2:3

If the volume of the smaller is V = 20cm³,
 what is the volume for the larger?

$$\frac{8}{27} = \frac{20}{x} \quad \text{67.5 cm}^3$$

Ex:

Two similar prisms have LA = 27cm² and LA = 75cm².

What is the scale factor?

27:75
 3:5

If the volume of the smaller is V = 121.5cm³, what is the volume for the larger?

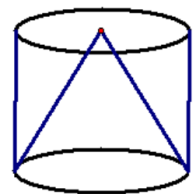
$$\frac{27}{125} = \frac{121.5}{x} \quad x = 562.5 \text{ cm}^3$$

Is this cylinder ~ to the cone?

No

Cylinder
Cone

Volume = 36 πu³
 Volume = ?



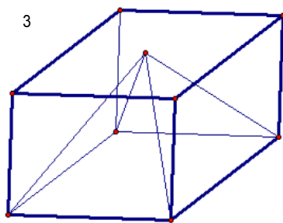
$$V = Bh$$

$$V = \frac{1}{3}Bh$$

$$\frac{1}{3} 36\pi = 12\pi u^3$$

Pyramid $\frac{1}{3}Bh$ Volume = $9u^3$
Prism $= Bh$ Volume = ?

$$= 27u^3$$



HW

p710-712

3-10, 27-31